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excusable even on the plea of pedagogical necessity. For example in the treatment of Mendel's pea hybrids the "wrinkled-smooth" seed character is given as similar in time of expression to the "tall-dwarf" plant character which in inheritance is one generation later in its apparent effect so that the statement that first generation dihybrid plants will all be tall and smooth-seeded individuals would be quite confusing to the beginning student if he repeated such an experiment for himself. For the purpose of illustrating the behavior of a dihybrid it serves the authors' purpose but there is certainly no lack of material which could be used equally well to illustrate this point without alteration of the actual facts.

The work of East, Shull, Emerson, Blakeslee and many others is freely drawn upon in bringing out the different phases of the subject. The chapters of chief interest to the geneticist are those on Parthenogenesis and Vegetative Apogamy, Inheritance in Gametophytes, and the Endosperm in Inheritance. A number of facts in regard to sex determination in plants have been gathered together. All these subjects have usually been scantily treated in books on genetics.

In the opinion of the writer the authors were not wise in including the complex subject of sterility in an elementary book of this kind especially as it is treated in the chapter on self-sterility. The beginning of the chapter emphasizes the importance of self-sterility as a means of insuring cross-pollination while the remainder is largely devoted to Belling's work on semi-sterility which has no significance in this connection. No clear distinction is made between the different types of sterility which would seem desirable if the subject is to be discussed at all. A chapter is devoted to the subject of hybrid vigor and the book closes with an able summary of the theoretical points involved in a consideration of the chromosomes as the bearers of the hereditary determiners.

Throughout there is shown a first-hand unfamiliarity with the genetical experiments discussed. In spite of this handicap a really

useful book, for those not primarily interested in genetics, has been produced which shows the authors' ability to coordinate many different, specialized fields of investigation and to put the results into an easily read form. The book is designed to fill an important place which would justify more care in the choice of material and in its presentation. The practice followed of giving few facts and discussing them in all their important relations to each other and to other fields of biology is perhaps the most valuable feature of the book.

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THE POWER SITUATION IN THE UNITED STATES

Two of the most important domestic problems facing the United States at the present time concern the supply of power necessary to maintain the industrial activities of the country, and the adequacy of transportation to move the raw materials and finished products involved in these activities. As the coal consumed in the United States engages over a third of the freight capacity of our railroads, and more and more coal is being used, the result is a growing burden upon transportation which must be relieved. The power problem and the transportation problem, therefore, are really different expressions of a single fundamental issue. In this connection the United States National Museum, Smithsonian Institution, has just issued a 50-page Bulletin, entitled "Power: Its Significance and Needs," which gives an analysis of the whole situation and presents a plan whereby the problems of water-power, coal-supply, and transportation may find a solution. This contribution is by Chester G. Gilbert and Joseph E. Pogue, of the Division of Mineral Technology, and is Part 5 of Bulletin No. 102, the Mineral Industries of the United States, which has already dealt constructively with such matters as coal-products, fertilizers, domestic fuel and petroleum.

Quoting from the conclusions of the authors of this Bulletin, it is stated:

The righting of the power situation requires (1) the establishment of a comprehensive system of electric transmission lines to be administered as a common-carrier system like the railways. (2) The provision of such a system will necessitate the co-ordinated growth of central power stations in coal fields and at water-power sites, and in doing so will open to business enterprise a tremendous field of opportunity hitherto closed off from entry, and thus lead to the balanced development of the two major energy resources, coal and water-power. (3) The principle of multiple production, recognized and incorporated in national policy, will supplement the additional service gained through the organized employment of the electrical principle; applied to the production of coal-generated electricity, and, through the medium of municipal public utility plants, to the distributive employment of coal, this principle will effectively correlate the recovery of the commodity and energy values, so as ultimately to effect a full saving of the former and an increased gain of the latter, thus permitting a further relative diminution of the amount of fuel calling for transportation in bulky form. The first two points reduce themselves to a single issue, which is purely a business proposition to be handled by a business organization; the third item is more intangible and it is a matter of policy, which, therefore, can not be delegated or otherwise handled in objective fashion.

The provision of a common-carrier system of transmission lines, in brief, is the key to the whole problem. Its establishment will remove the retarding influence of high interest rates and antagonistic misunderstanding that has blocked water-power development, and will afford the point of departure from precedent in favor of coal-field generation of electricity. Owing to the magnitude of the issue and the manifold lines of progress directly at stake, the development will provide a nuclear point for the establishment of a constructive economic policy, needed not merely for the full development of this field but as well for proper unfoldment of the industrial possibilities of the country in general. As such a policy has not developed in the past because of economic sectionalism growing chiefly out of an unequalized development of the energy resources, the nationalization of industrial opportunity attainable through a balanced development of power supply will clear the path of the main obstruction to unified action.

Thus specific action in respect to establishing a common-carrier system adapted to the power needs of the country will not only go far toward solving

the problem of transportation, but it will improve the fuel supply, correct the economic fallacy of drawing upon capital resources while neglectful of income, contribute to the recovery of the values now lost in the consumption of raw coal, lead to an adequate development of electrochemical activities, cut off a needless annual expenditure running well beyond the billion dollar mark, and constitute a potent contribution in the direction of stimulating the upgrowth of a constructive economic policy of national scope attuned to the needs of modern industrial development. It is believed that these results would involve national economies, offsetting in large part the cost of the war.

SPECIAL ARTICLES

THE COEFFICIENT OF EXPANSION OF LIVING TREE TRUNKS

THE present investigation was undertaken as a continuation of the work of the late Professor C. C. Trowbridge, of the Department of Physics, Columbia University, on the movements of the branches of trees, with the object of inquiring into the mechanism of these movements. Part of the work had been carried out in collaboration with Professor Trowbridge.

The measuring apparatus, as devised by him, consisted of a rod of invar, with four steel knobs set on short steel posts fitted into the rod near one end, at intervals of ninety degrees, and also with one or more small brass blocks in the form of square prisms, fitted over the rod at some distance from that end. A steel-pointed block and a conical steel socket were attached to the tree under investigation, and a measurement was made by holding one of the steel balls in the socket, and making a light scratch on the brass plate by gently drawing it over the steel point. A careful record was kept of the exact position on the brass plate of each of the scratches made, and the distances between them were measured under the microscope. In the tests made previous to the tree-trunk work, the instrument was found to be suitable for general laboratory work as well as

¹ C. C. Trowbridge, "The Thermometric Movements of Tree Branches at Freezing Temperatures," *Bulletin of the Torrey Botanical Club*, 43, No. 1, pp. 29-56, 1916.